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INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 010261WOJZF		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/US 03/5305	International filing date (day/month/year) 06.11.2003	Priority date (day/month/year) 08.11.2002	
International Patent Classification (IPC) or both national classification and IPC B29C45/16			
Applicant OMNOVA SOLUTIONS, INC. et al.			

1. This International preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
  - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains Indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

Date of submission of the demand  02.06.2004	Date of completion of this report  10.02.2005
Name and mailing address of the International preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Kujat, C  Telephone No. +49 89 2399-2360  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/US 03/35305**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-20 as originally filed

**Claims, Numbers**

5-18 as amended (together with any statement) under Art. 19 PCT  
1-4 filed with telefax on 12.11.2004

**Drawings, Sheets**

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 7-18

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the said claims Nos. 7-18

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-6
Inventive step (IS)	Yes: Claims	
	No: Claims	1-6
Industrial applicability (IA)	Yes: Claims	1-6
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

- 1.1 The amendments filed under Article 34 PCT, i.e. the feature "an associated data collection means" introduced into amended independent claims 1 and 4, relate to an invention in respect of which no international search report has been established.
- 1.2 Therefore, the international preliminary examination authority, in conformity with Rule 66.2 (a) (vi) PCT has decided not to carry out the international preliminary examination in respect of these claims.
2. **Thus, the set of claims originally filed and relating to the first invention, i.e. claims 1 to 6, will be the basis for the subsequent assessment of novelty and inventive step.**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement for claims 1 to 6**

Reference is made to the following document:

D1: US 2002/039656 A1 (THOMPSON JOHN A ET AL) 4 April 2002 (2002-04-04)

- 3.1 With regard to independent method claim 1 (as filed), document D1 discloses a method of determining when to inject a coating (paragraph 71: "must then determine ... so that the IMC may be injected at the proper time") for contacting a surface of a moulded article in a mould in an in-mould coating process, the method comprising the steps of : determining an internal mould pressure (paragraph 72: "by observation of pressure") after a mould has been filled with a predetermined amount of thermoplastic (paragraph 2: "thermoplastic polymeric material"), monitoring over time (paragraph 71: "at the proper time") the internal mould pressure as said thermoplastic cools in the mould (paragraph 54: "begun after the previously

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injected material has begun to cool. This time is predetermined as described in more detail below."), determining from a change in the internal pressure (paragraph 72: "when the moulded part reaches its melt temperature ... thus reducing the pressure") that a surface of said thermoplastic has cooled to below its melt temperature.)

- 3.2 Document D1 also shows the additional features of dependent claims 2 and 3. In particular, see paragraphs 72 for claim 2 and 60 to 62 for claim 3.
- 3.3 Therefore, the subject-matters of claims 1 to 3 are considered not novel, Art 33(2) PCT.
- 3.4 For the reasons given in paragraph 3.1, the subject-matter of independent method claim 4 is already disclosed in document D1. In particular, see paragraph 58 for measurements of temperature.
- 3.5 Document D1 also shows the additional features of dependent claims 5 and 6. In particular, see paragraph 58 for claim 5 and 73 ("is controlled by time") or 21 ("single system control") for claim 6.
- 3.6 Therefore, the subject-matters of claims 4 to 6 are considered not novel, Art 33(2) PCT.
- 4.1 Although claims 1 and 4 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought or in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.
- 4.2 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in document D1 is not mentioned in the description, nor is this document identified therein.

What is claimed is:

1. A method for determining when to inject a coating for contacting a surface of a molded article in a mold in an In-mold coating process, the method comprising the steps of:

determining an internal mold pressure after a mold has been filled with a predetermined amount of a thermoplastic;

using a control apparatus with an associated data collection means, monitoring over time the internal mold pressure as said thermoplastic cools in the mold; and

determining from a change in the internal pressure that a surface of said thermoplastic has cooled to below its melt temperature.

2. A method according to claim 1, wherein said change in internal pressure is a reduction in pressure.

3. A method according to claim 1, wherein the internal pressure rises as said thermoplastic is injected into said mold, and subsequently decreases as said thermoplastic cools.

4. A method for In-mold coating a thermoplastic substrate, the method comprising the steps of:

injecting a thermoplastic substrate into a closed mold, wherein at least one of an internal mold temperature and an internal mold pressure is monitored;

allowing a surface of said thermoplastic to cool to a point below its melting temperature to form a molded article;

injecting a coating into said closed mold such that said coating contacts at least a part of said surface of said thermoplastic, wherein said coating is injected at a point wherein at least one of said internal mold temperature and internal mold pressure is indicative of the point when said thermoplastic has cooled to below its melting temperature as determined by using a control apparatus having an associated data collection means.

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**REPLACEMENT PAGE**

AMENDED SHEET

5. A method according to claim 4, wherein said internal mold temperature and internal mold pressure is measured by a sensor.
6. A method according to claim 5, wherein a measurement determined by said sensor is relayed to the control apparatus controlling the injection of said coating.
7. A method for ensuring the quality of in-mold coated thermoplastic parts, the method comprising the steps of:
  - a) manufacturing an in-mold coated thermoplastic part by molding a thermoplastic using a first set of process conditions in a closed mold to form a substrate and subsequently contacting an in-mold coating with said substrate by injecting an in-mold coating into said closed mold;
  - b) inspecting the coated thermoplastic part;
  - c) determining whether the molding of the thermoplastic should be optimized for failure to meet defined quality control standards;
  - d) optimizing the process conditions of the molding of the thermoplastic by adjusting one or more of injection volume, injection temperature, injection pressure, and molding pressure;
  - e) determining whether the coating of the substrate should be optimized for failure to meet defined quality control standards; and
  - f) optimizing the process conditions of the coating of the substrate by adjusting one or more of cure time, injection time, injection pressure, injection volume, injection temperature, or mold temperature at injection for said in-mold coating.
8. A method according to claim 7, wherein step c) is performed by determining whether said thermoplastic substrate exhibits at least one of voids and inadequate filling of said mold.
9. A method according to claim 7, wherein said first set of process conditions includes: one or more injection pressures for said thermoplastic, one

or more injection temperatures for said thermoplastic, one or more injection volumes for said thermoplastic, one or more injection times for said thermoset, one or more injection pressures for said thermoset, one or more injection volumes for said thermoset, and one or more cure times for said thermoset.

10. A method according to claim 7, wherein step e) is performed by at least one of determining whether said coating is intermingled with said substrate, determining whether a surface appearance of said coating is acceptable for a defined end use, and determining whether there is sufficient adhesion between said coating and said substrate.

11. A method according to claim 7, wherein said coating is injected into said mold at a point after said thermoplastic has cooled to a temperature below its melt temperature.

12. A method according to claim 11 wherein said point is determined by the monitoring of a temperature in said mold.

13. A method according to claim 11, wherein said point is determined by the monitoring of an internal pressure in said mold.

14. A method according to claim 7, wherein steps a) – f) are performed repeatedly until an in-mold coated thermoplastic part is produced that meets defined quality standards.

15. A method according to claim 7, wherein step f) is performed by at least one of 1) adjusting a time at which said in-mold coating is injected into said mold relative to a time at which the molding process is begun, and 2) adjusting a time at which said mold is opened and the coated part is removed from said mold relative to a time at which said in-mold coating is injected into said mold.

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AMENDED SHEET (ARTICLE 19)



16. A method according to claim 7, wherein step f) is performed by adjusting an injection pressure for said in-mold coating.

17. A method according to claim 7, wherein values for one or more of said process conditions for said molding and coating steps are controlled and recorded by a control apparatus operatively associated with said mold.

18. A method according to claim 7, wherein said optimized process conditions are stored in a control apparatus associated with said mold and may be recalled for use in future molding processes.

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**AMENDED SHEET (ARTICLE 19)**